1. World and Domestic Grain Marketing in the 1980's*

"Producing for the 1980's" has been a theme of a number of agricultural symposiums and farm meetings in the last few months. This involves taking a forward look at the opportunities and challenges of Western Canada's agricultural industry during the next decade. The focus is production. However, if the agricultural industry learned anything from the experience of the previous two decades, 1960 to 1979, it was that markets and particularly marketing capability are crucial and limiting factors. We learned that we must take a systems view of our grain industry. We realized in the last few years that Western Canada's transportation and handling system was not sufficient to meet Western Canada's grain and oilseed production and export capability. The future needs and hence decisions for expanding the transportation and handling system, are largely dependent upon Western Canada's production capacity. The answer to the question of productive capacity is in turn dependent upon technological economic and agronomic factors.

We thus have the classic chicken and egg problem. What do we expand first - production or marketing? It is a systems problem, and it requires making forecasts of future productive capacity and market potential. Based on our best estimates of these two variables, we develop the necessary marketing and agricultural input infrastructure. This, of course, includes the future demands for fertilizers and other agricultural inputs.

2. The Potential Market Demand for Western Canadian Grains and Oilseeds - 1990

Western Canada has two basic markets for its grains and oilseeds; domestic and international (export). Some might argue that it is really one market, since there are few restrictions on the importation of particularly grains and oilseeds and Canadian prices are strongly influenced by the international market.

Since the domestic market is stable for wheat, growing but relatively non-variable for oilseeds and coarse grains I intend to focus on the international market. For analytical and projection purposes I will essentially look at three categories of commodities; wheat including durum, coarse (feed) grains and oilseeds.

The potential growth in Canadian grain and oilseed exports is dependent upon the total growth in trade, and Canada's ability to

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* Gary G. Storey, Professor, Department of Agricultural Economics, University of Saskatchewan. Paper presented at Soils and Crops Workshop, February 16, 1980, Saskatoon.

maintain its current, or expand, its market share. Trade in grains and oilseeds has expanded steadily since the second world war. It has resulted because, increasingly the majority of the countries of the world have not been able to meet domestic food and feedstuff requirements from domestic production.

Demand is dependent upon several key factors; population and income growth, tastes and preferences, and foreign currency. Supply is dependent upon acreage and yield, which is in turn dependent upon technology in the form of higher yielding varieties, level of inputs, and most important, weather. Trade is dependent upon the differences between demand and domestic supply.

Most of the models that have been developed to forecast future world trade for agricultural commodities have developed forecasts for demand and supply. From this, forecasts for import requirements, and export capability, have generated trade forecasts. These studies have been developed by such agencies as F.A.O., U.S.D.A., Japan and others.

Time does not allow me to follow this approach. What I have done is to make projections for world trade to 1985 and 1990 farm past trade data.. This employs much simpler trend analysis, and for this reason should not be taken as a forecast, it is a projection. Projections are made for wheat, feedgrains and oilseeds (vegetable) and flaxseed. This approach has been used by several Canadian agencies to make projections of future Western Canadian trade. We will examine these later.

2.1 Projections for World Wheat Trade and Trade Patterns.

If we look at the historical pattern of world wheat and flour trade from 1950 to 1979, we see that trade has grown from 27.1 million tonnes, 1950/51 - 1952/53 average, to 44.6 million tonnes, 1960/61 to 1962/63 average, to 58.2 million tonnes, 1970/71 - 1972/73 average, and to 75.9 million tonnes, 1977/78 - 1979/80 average. (See Figure 1). This is almost a doubling of world trade in 30 years.

Fitting a linear trend to the 30 years trade data, 1950 - 1979, produces an estimate for world trade of 83.0 million tonnes for 1985 and 91.7 million tonnes for 1990. However, world trade in 1979/80 was 83.4 million tonnes, surpassing the 1985 projection. The trade for this year, 1980-81, is estimated to reach 85.7 million tonnes. This would suggest that the actual growth in trade is not linear, over the 30 year period. If we stay with the linear projection, but use a more recent period, 1970/71 to 1979/80, we get a trade estimate of 89.5 million tonnes for 1985 and 102 million tonnes for 1990.

As world wheat trade expanded, the pattern of trade has changed. (See Table 1). Western Europe, once the major import region for wheat with 48.5% of world trade in the early 1950's, has declined in importance to 9.0% of world trade in recent years (1977/78 -1979/80). Its level of imports has also declined from a fairly constant 13.0

Figure 1 World Wheat (and Flour) Trade 1950/51 - 1979/80

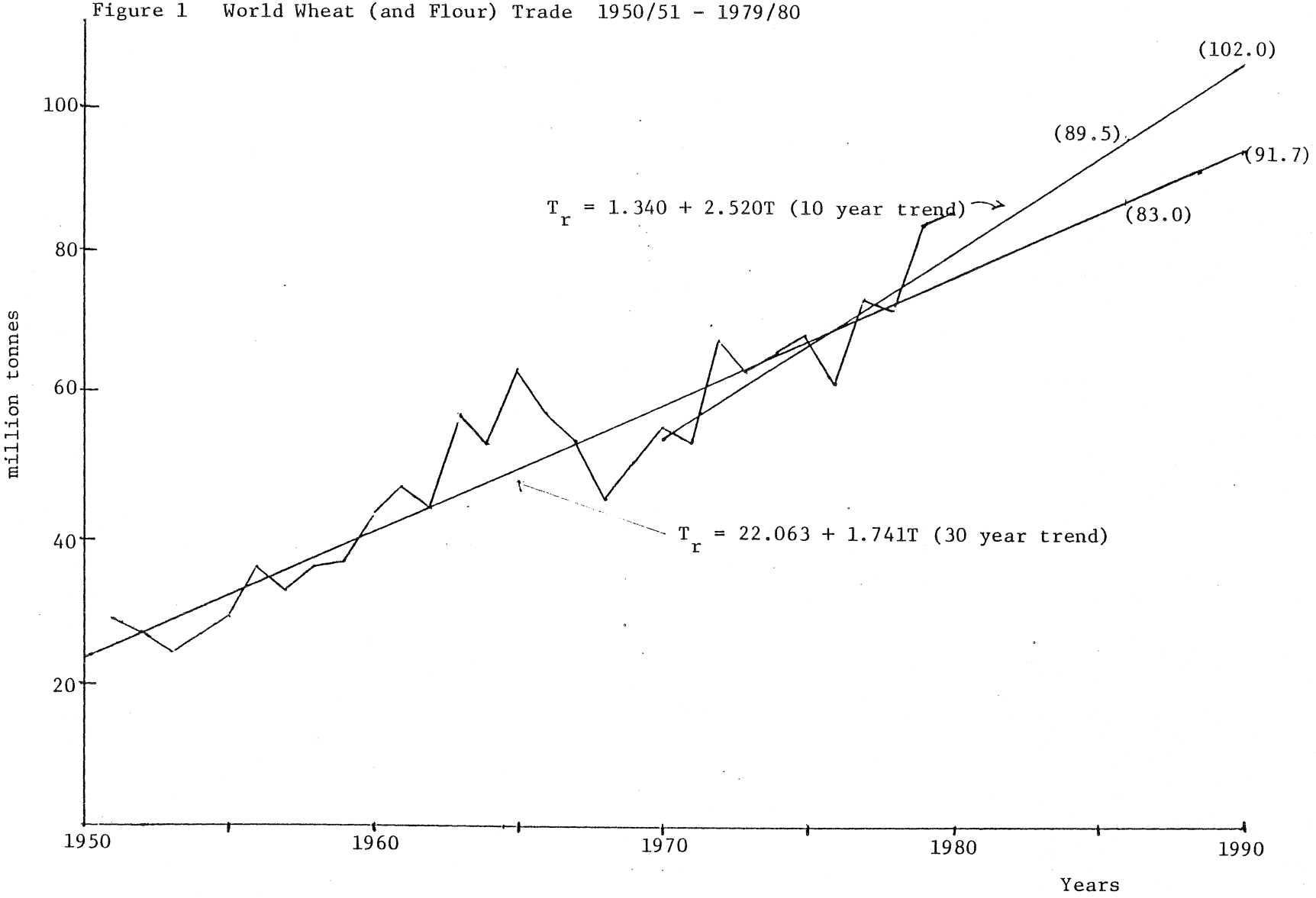


Table 1

World Wheat Imports by Region, 1950/51 to 1979/80
Benchmark Periods

Periods	World Imports	Western Europe	Eastern Europe & USSR	Japan	China	Other
	- - - - - - - - - Millions of Tonnes - - - - - - - - -					
1950/51-1952/53	27.4	13.3	1.7	1.6	.2	10.6
1960/61-1962/63	44.5	13.1	6.3	2.8	4.5	17.8
1970/71-1972/73	61.8	13.0	13.3	5.1	4.0	26.4
1977/78-1979/80	75.9	6.8	12.8	5.7	8.4	42.2
	- - - - - - - - - - Percent Share - - - - - - - - - -					
1950/51-1952/53	100.0	48.5	6.2	5.8	.7	38.7
1960/61-1962/63	100.0	29.4	14.2	6.3	10.1	40.0
1970/71-1972/73	100.0	21.0	21.5	8.3	6.5	42.7
1977/78-1979/80	100.0	9.0	16.9	7.5	11.6	55.6

Source: USDA, FAS, World Grain Trade Statistics 1950/51 - 1972/73.
USDA, Wheat Situation.

million tonnes, to around 7.0 million tonnes.

Eastern Europe and the U.S.S.R., once major wheat exporters, have increasingly become net importers. Because of large variations in production, particularly in the U.S.S.R., imports have been erratic. Their import share, has been 17-22% in the last 10 years, with average import levels at approximately 13 million tonnes.

Japanese imports have shown a steady growth, from 1.6 million tonnes in 1950/51 - 1952/53 to 5.7 million tonnes in 1977/78 - 1979/80. Their share of world imports, however, has remained fairly constant partly because of a modest population increase and a rising per capita income causing shifts to other foods from traditional cereals.

One of the most significant developments, has been the entry of the People's Republic of China as a major wheat importer. Importing virtually no wheat in the 1950's, today China imports in the area of 8-11 million tonnes, 10-13 percent of world trade.

The major growth area, for future world trade in wheat, lies with the developing countries in South and Central America, Africa and Asia. This is largely because of a continued population growth. Although most of us are aware of the figures it might be useful to briefly examine the population projections for 1990, and I will add, 2000. In Table 2, I have listed four projections for world population based on two agency studies. The first are estimates made by the United States Bureau of Census, and the other three are from the Community and Family Study Center (C.F.S.C.). The latter agencies projections, and they have three levels, high, medium and low, are based on optimistic estimates for the decline in fertility levels for the devloping countries. Their assumption of lower fertility levels is based on increasing pressures to reduce numbers of children. "This pressure is manifested at the aggregage (governmental and policy) level and at the level of the family and the individual." (Global 2000 Report, p. 24). Recent evidence would suggest that C.F.S.C.'s projections might be more correct than the much higher estimates of the U.S. Census Bureau and the United Nations.

The U.S. Census Bureau projects a world population at 5.545 billion in 1990 and 6.798 billion in 2000. By contrast the C.F.S.C., using the middle series estimates, projects world population at 5.137 billion in 1990 and 5.883 billion in 2000. After 1980 and 1990 the world must feed 996 (U.S. Census Bureau) or 757 (C.F.S.C.) more people by 1990, and 2,249 (U.S. Census Bureau) or 1,503 (C.F.S.C.) more people by 2000. In percentage terms, this is 21.8% and 49.4% more people by 1990 and 2000 respectively using U.S. Census Bureau figures; or 11.7% and 34.3% more people by 1990 and 2000 respectively using C.F.S.C.'s figures.

The projections are significantly different, in terms of the challenges of meeting world food requirements. The implications for production and world trade projections are quite different. It is conceivable that our linear trend projections might exaggerate

Table 2

World Population (With Alternative Projections) and Regional Projections with Percentage Shares

	1950		1980		1990		2000	
	- - - - - - - - - - - - - - - - Millions - - - - - - - - - - - - - - - -							
World - U.S. Census Bureau	2,501		4,549		5,545		6,798	
- Community and Family Study Center								
- high series			4,380		5,152		5,974	
- medium series			4,380		5,137		5,883	
- low series			4,378		5,102		5,752	
Regions*		%		%		%		%
Northern America, Western Europe, Japan, Australia and New Zealand	564	(22.3)	738	(16.8)	779	(15.2)	812	(13.8)
USSR and Eastern Europe	269	(10.8)	402	(9.2)	434	(8.4)	457	(7.8)
Africa	219	(8.8)	465	(10.6)	612	(11.9)	781	(13.3)
Asia and Oceania	1,284	(51.3)	2,418	(55.2)	2,859	(55.7)	3,281	(55.8)
- Peoples' Rep. of China	(558)		(952)		(1,044)		(1,125)	
- India	(352)		(676)		(816)		(946)	
- Indonesia	(75)		(144)		(171)		(194)	
- Pakistan	(36)		(80)		(104)		(130)	
- Bangladesh	(41)		(91)		(121)		(154)	
Latin America	164	(6.6)	357	(8.2)	454	(8.8	552	(9.4)
- Brazil	(53)		(123)		(155)		(186)	

* Figures shown are based on CFSC medium series, except 1950 figures taken from UN Population estimates.

Source: The Global 2000 Report to the President; Agriculture Canada, Handbook of Food Expenditures, Prices and Consumption.

potential wheat trade, because with shifts in world trade patterns, it has been the developing countries Africa, Latin America, China and other Asia that have accounted for the major growth in world wheat Trade. This group had 39.4% of world trade in the early 1950's; and 66.2% in the last part of the 1970's. (See Table 1).

Before we look at the implications for Canada we should examine the trade prospects for coarse grains and oilseeds.

2.2 World Coarse Grain Trade, Projections and Patterns.

The coarse grains include corn, barley, oats, sorghum and rye. Corn dominates the export market. Corn's share of the world coarse grain trade was 35.1% in the early 1950's while its share in the mid 1970's was over 70%. The remaining 30% is split fairly equally between barley and sorghum. International trade in rye and oats is insignificant.

Trade in coarse grains has grown even more dramatically than for wheat. In the early 1950's (1950/51 - 1952/53) trade was approximately 13.4 million tonnes, compared to wheat at 24.1 million tonnes for the same period. In recent years trade in coarse grains has exceeded 90 million tonnes. In 1979, exports stood at 99.4 million tonnes compared to wheat at 83.4 million tonnes.

Projections of trade based on the past 30 years using linear trend, provides an estimate of trade in 1985 of 101.6 million tonnes, and 116.4 million tonnes for 1990. But as mentioned above, trade has already reached 99 million tonnes. A visual inspection of trade data suggests an increasing rate of change, or curvilinear relationship (see Figure 2). To take account for this, a trend line was fitted using the 1970/71 to 1979/80 period. This provides projected trade estimates of 126.3 million tonnes for 1985 and 150.9 million tonnes for 1990.

The more rapid expansion in coarse grain trade than for wheat, has resulted primarily from increased meat production particularly in the developed countries, Western Europe, Japan and U.S.S.R. and Eastern Europe. Japan accounts for approximately 20% of world coarse grain trade, and Western Europe 26.7%. The trade pattern for coarse grains has changed toward the LDC's but not as significantly as for wheat. (See Table 3).

World Oilseed Trade, Projections and Patterns.

Since the second world war, there has been a rapid expansion in world production and utilization of vegetable oils and meals. Trade has expanded in a similar manner. In the 1950 to 52 period, world trade in oilseeds consisting of soybeans, cottonseed, rapeseed, sunflower seed and groundnuts (peanuts) stood at 2.2 million tonnes. (See Figure 3). Ten years later, in 1960-62 trade reached 6.9 million tonnes, and 16.3 million tonnes in 1970-72. More recently, 1976-78, trade averaged 24.4 million tonnes.

Figure 2 World Coarse Grain Trade 1950/51 - 1979/80

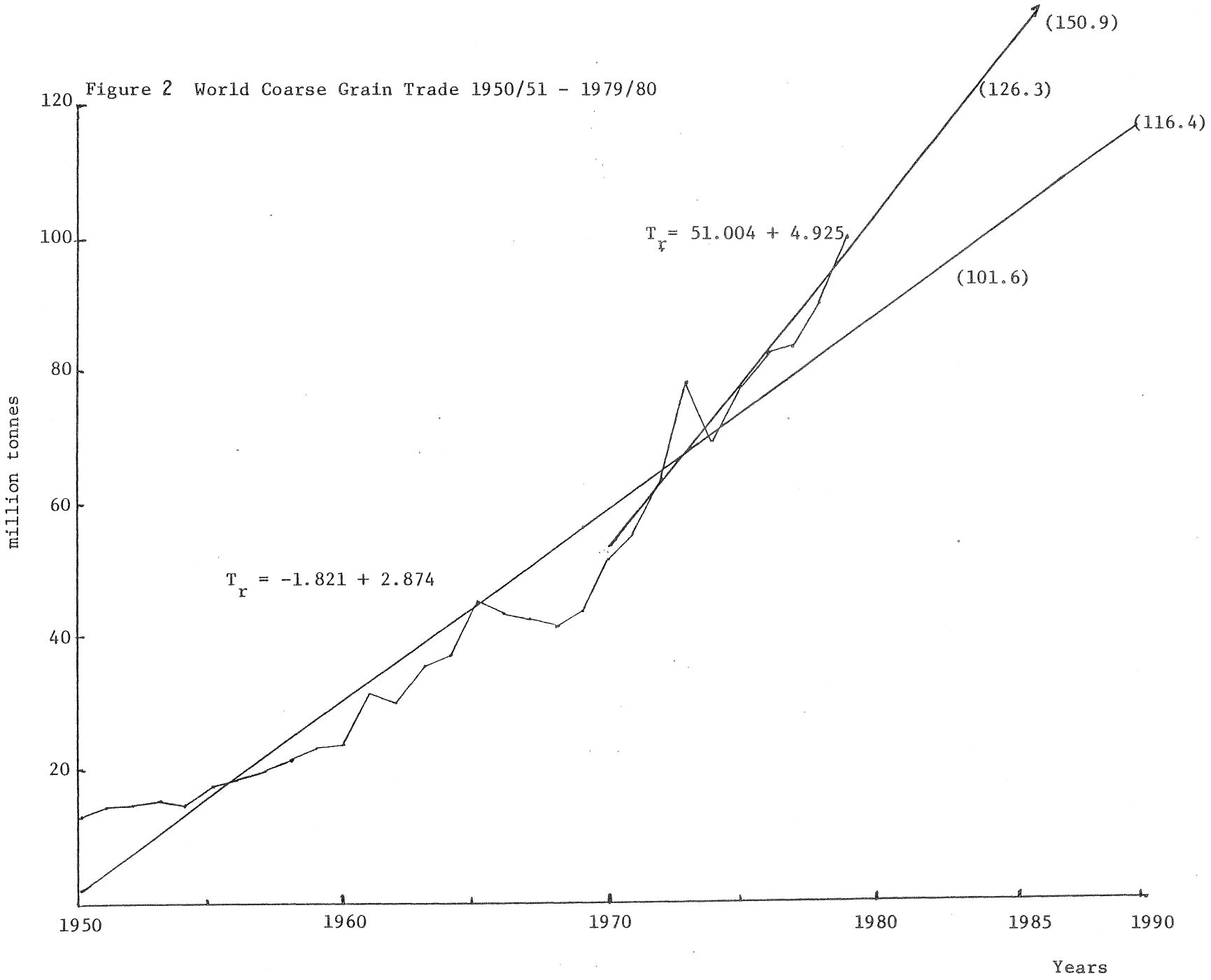


Figure 3 World Oilseeds Trade - Benchmark Periods, 1950-52 to 1976-78

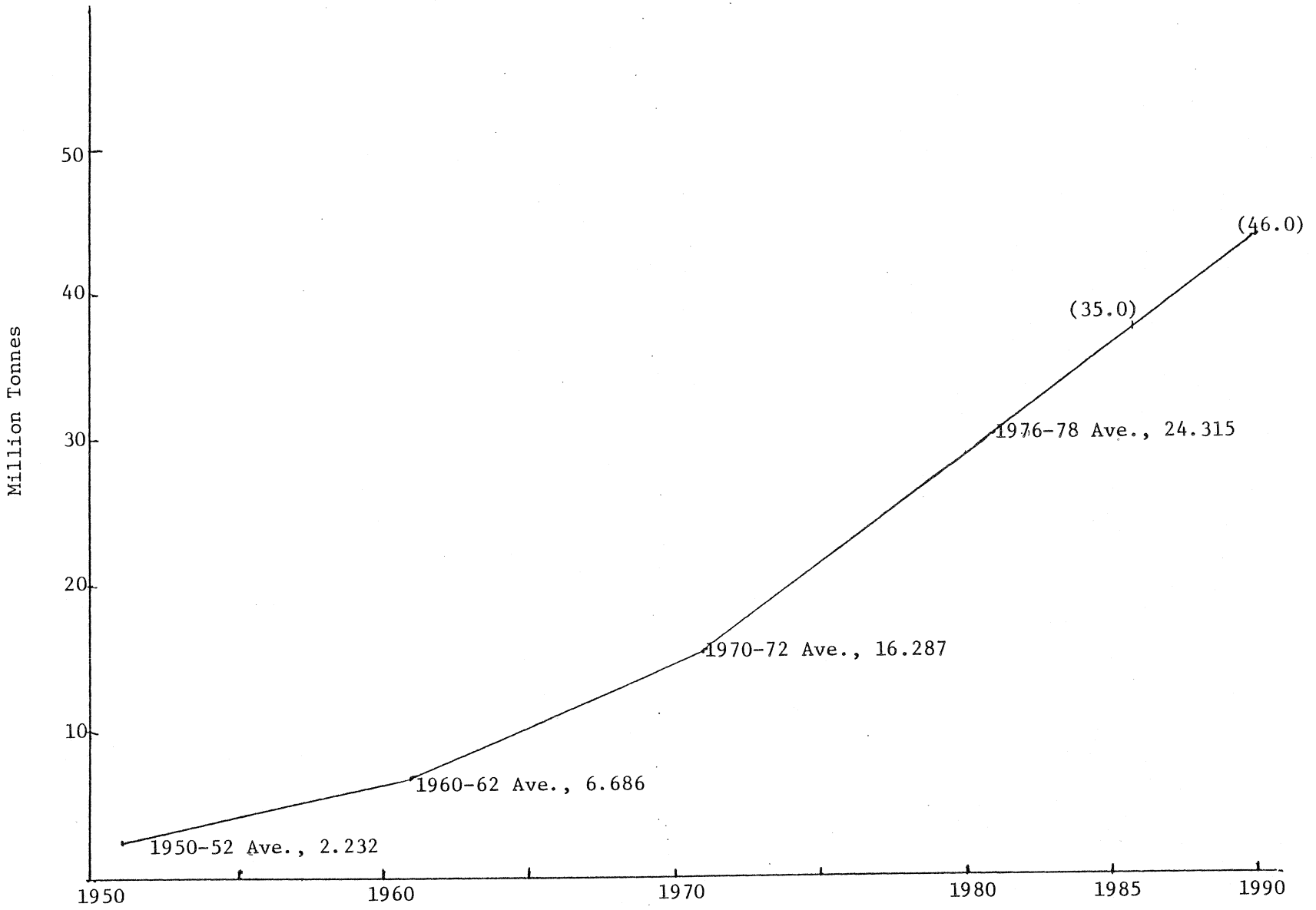


Table 3

World Coarse Grain Imports by Region, 1950/51 - 1979/80
Benchmark Period

	World Imports	Western Europe	Eastern Europe & USSR	Japan	Other
			Millions of Tonnes		
1950/51-1952/53	13.8	8.1	1.4	.9	3.4
1960/61-1962/63	27.6	18.6	1.8	2.4	4.8
1970/71-1972/73	55.8	28.4	7.7	10.8	8.4
1977/78-1979/80	90.9	24.3	13.4	17.8	35.4
			Percent Share		
1950/51-1952/53	100.0	58.7	10.1	6.5	24.6
1960/61-1962/63	100.0	67.4	6.5	8.7	17.4
1970/71-1972/73	100.0	50.9	13.8	19.4	15.9
1977/78-1979/80	100.0	26.7	14.7	19.6	38.9

Source: USDA, FAS, World Grain Trade Statistics, 1950/51-1972/73.
USDA, Feed Situation.

An extrapolation of trade, using the 1970-72 and 1976-78 average benchmark periods, would provide a trade projection for oilseeds of approximately 35 million tonnes for 1985 and 46 million tonnes by 1990. This is a crude projection, since no regression was fitted as was done for wheat and coarse grains. It suggests, nevertheless, that the prospects for trade are very large. Like coarse grains future trade will depend primarily on the continued expansion of world meat consumption, hence, production particularly in the developed countries. Western Europe and Japan have been the major markets. Western Europe is only 10% self-sufficient in oilseeds, and the prospects for expanding production, primarily rapeseed, are not great.

World trade in vegetable oils has also expanded although not as great as has oilseeds with most countries preferring to do their own crushing. Figure 4 shows the level of trade for the selected benchmark periods. In 1976-78 trade stood at 6.7 million tonnes, compared to only 1.2 million tonnes in 1950-52. The data includes; olive, soybean, groundnut, cottonseed, rapeseed, sunflower seed and palm oil (coconut oil was omitted).

An extrapolation of the trend, based on the 1970-72 and 1976-78 benchmark periods, produces an estimate of trade of approximately 10 million tonnes in 1985 and 12 million tonnes in 1990. Again, this is fairly crude estimation procedure.

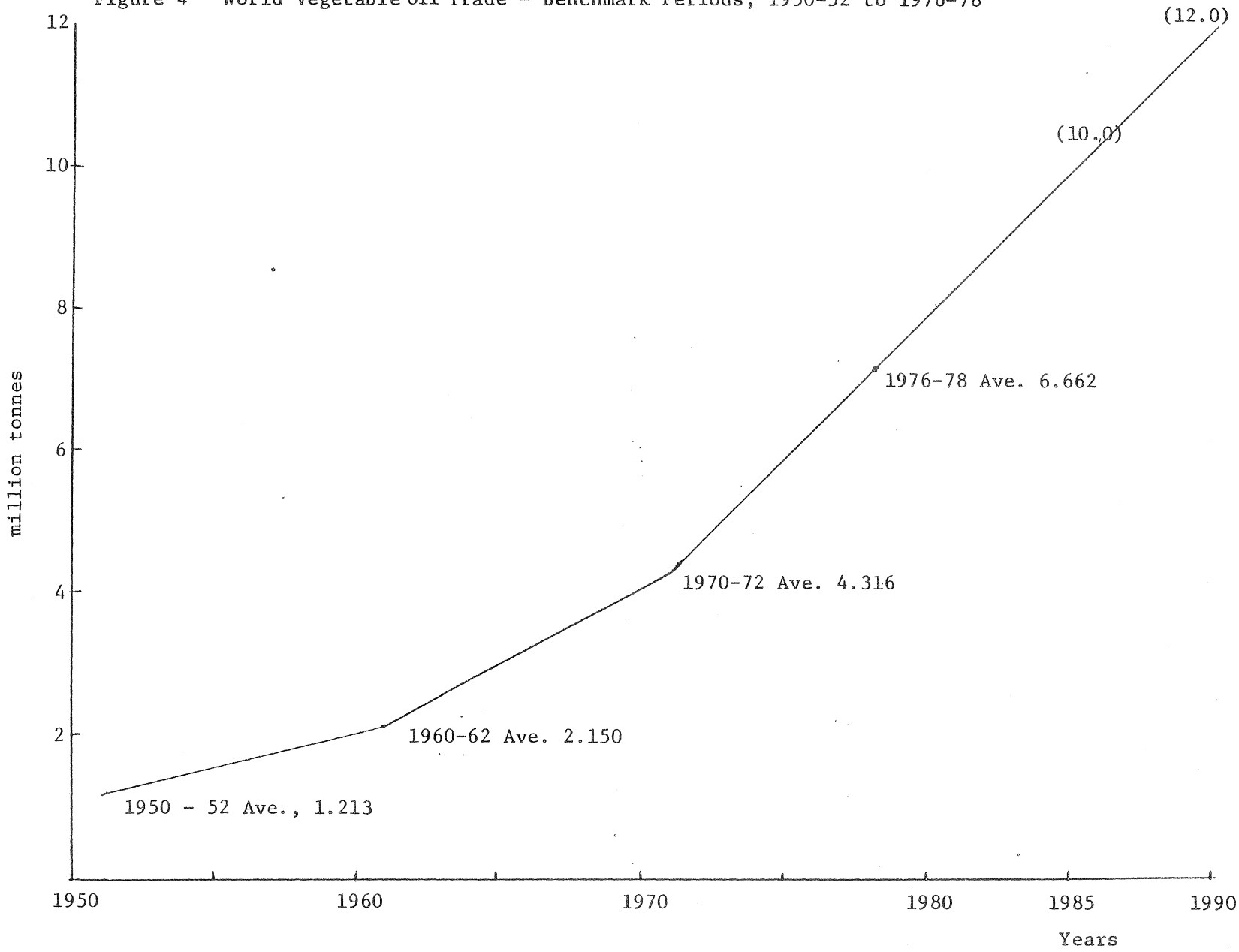
Because flaxseed is used primarily to produce linseed oil, for industrial purposes, it was examined separately from the vegetable oils. Other industrial oils, including tung oil were not included. Trade in linseed oil has remained almost constant at 270 thousand tonnes since the early 1950's. Trade in flaxseed showed some growth from 423 thousand tonnes in 1950-52 to 763 thousand tonnes in 1960-62, but it has declined to 484 thousand tonnes in 1976-78.

Prospects for trade expansion primarily depend upon developments in the paint and varnish industry, the major uses for linseed oil, and potential new uses for which there are several. The paint industry has primarily switched to petroleum based synthetics. It is not clear what effect the escalating price for petroleum will have on a return to linseed oil based paints.

Total trade projections for wheat,coarse grains, oilseeds and flaxseed to 1985 and 1990, are 196.8 and 222.3 million tonnes respectively. This is using the 30 year linear trend for wheat and coarse grains. Using the recent 10 year trend for wheat and coarse grains, provides higher estimates for 1985 and 1990 of 228.9 and 268.1 million tonnes.

Clearly these projections suggest a very large potential trade in grains and oilseeds to 1990. What are the implications for Western Canada?

Figure 4 World Vegetable Oil Trade - Benchmark Periods, 1950-52 to 1976-78



3. Implications for Western Canadian Markets and Marketings

An examination of the international export market in grains and oilseeds indicates that Canada's market share has declined over the last 30 years. As outlined in Table 4, Canada's share of world wheat exports has declined from 32.1% in the early 1950's to 19.2% recently. By comparison, the U.S.share has risen from 38.7% to 44.3% for the similar periods. Canada's share of the coarse grain trade has declined from 16.4% to 4.5%; the U.S. share has risen from 35.8% to 66.0%. For oilseeds, Canada's share has increased from .3% to 4.7%; the U.S. share has risen from 32.3% to 74.81%. For flaxseed, Canada's share of world trade has increased from 19.8% to 67.8%, as U.S. exports have virtually ceased. U.S. is currently a net flaxseed importer.

The expansion of trade in grain and oilseeds, if it is to occur, will be supplied by only a handful of exporters. It is difficult to predict what future market shares will be. In recent years we have seen the United States significantly expand its market share of the international coarse grain and oilseeds market, and expand slightly its share of the wheat market. Future market shares will depend upon relative production capabilities.

The United States dominates world grain and oilseed markets on the strength of extensive acreage and increased productivity. Corn is the United States Cinderella crop - with U.S. yields increasing from 39.4 bushels/acre in 1954 to 90.8 bushels/acrae in 1977. Over this period acreage has remained constant, but nitrogen applied per harvested acre has increased from 27 lbs. in 1954 to 128 lbs. in 1977.

What about future United States production. The United States should have increasing difficulty expanding production at the rate of the previous 30 years. One must remember that the United States for much of the later 1950's, 1960's and early 1970's, had approximately 60 million acres of land out of grain production. For the last several years this land has been back in production. The technological development of hybrid corn and corn's ability to respond to inputs such as fertilizer may be difficult to duplicate in the 1980's. Elsewhere, there are few areas in the world with unused productive land, Brazil and parts of Africa are minor exceptions.

Projections for Canadian trade are made based on 1977/78 - 1979/80 market shares. They are outlined in Table 5 for 1985 and 1990 using the two alternative projection levels for world trade.

Table 4

Canada and United States Market Shares of International Wheat, Coarse Grains, and Oilseeds Trade, 1950/51 - 1979/80 Benchmark Periods

Years	Wheat		Coarse Grains		Oilseeds		Flaxseed		Total		
	Canada	United States	Canada	United States	Canada	United States	Canada	United States	World	Canada	United States
	- Million Tonnes -										
1950/51-1952/53	8.7	10.5	2.2	4.8	.0	.7	.084	.077	43,006	10,984	16,077
1960/61-1962/63	9.4	18.3	.8	13.3	.2	4.1	.338	.107	79,560	10,738	35,807
1970/71-1972/73	13.6	22.9	4.1	25.1	1.1	11.9	.572	.118	130,658	19,372	60,018
1977/78-1979/80	14.6	33.6	4.1	60.0	1.2	18.2	.328	.012	191,450	20,228	111,812
	- Percentage -										
1950/51-1952/53	32.1	38.7	16.4	35.8	.3	32.3	19.8	18.2	100.0	25.5	37.4
1960/61-1962/63	21.1	41.0	2.9	47.8	3.4	59.8	56.9	18.0	100.0	13.5	45.0
1970/71-1972/73	23.4	39.3	7.3	44.9	6.6	72.9	75.0	15.5	100.0	14.8	45.9
1977/78-1979/80	19.2	44.3	4.5	66.0	4.7	74.8	67.8	1.7	100.0	10.6	58.4

Source: USDA, FAS, World Grain Trade Statistics, 1950/51-1972/73.
USDA, Wheat, Feed Grain and Fats and Oil Situation Reports.

* 1950-52, 1960-62, 1970-72, and 1976-78 for oilseeds and flaxseed.

Table 5
Projections of Canadian Exports for 1985 and 1990
Based on 1977/78 - 1979/80 Market Shares

	Canadian share	30 Year Trend 1985	30 Year Trend 1990	10 Year Trend 1985	10 Year Trend 1990
		million of tonnes			
Wheat	19.2	16.5	17.9	17.7	20.1
Coarse grains	4.5	4.6	5.2	5.7	6.8
Oilseeds	4.7	1.6	2.2	1.6	2.2
Flaxseed	67.8	.3	.3	.3	.3
Total		23.0	25.6	25.3	29.4

oilseed exports of 23.0 million tonnes for 1985, and 25.6 million tonnes for 1990. The 10 year trend provides export projections of 25.3 and 29.4 million tonnes for 1985 and 1990 respectively.

These figures are below the 30 million tonne export figure for 1985 that has been used by the Canadian Wheat Board, grain industry and government for a target and planning purposes. Dr. H. Bjarnason, of the C.W.B., has suggested that Canada "should be able to export roughly 20 million tonnes of wheat and up to 10 million tonnes of feed grains from the Prairies". (H.J. Bjarnason, October 18, 1978). If Canada should export 10 million tonnes of coarse (feed) grains in 1985 it would give Canada a world market share of between 8-10%. This is considerably higher than 5% share at present. However, Canada should have no difficulty obtaining a 10% share, or higher, given production and marketing capability.

The Canadian Wheat Board has proven with export promotion programs, and judicious pricing policies, Canadian barley can replace U.S. corn in many markets. The import demand for Canadian barley is thus price elastic. Where Canada has such a small share of the world market, price cutting is not likely to bring about retaliation. A similar situation should exist for rapeseed based on its low world market share.

At 10% market shares for coarse grains and oilseeds, projections for 1985 and 1990 trade would increase to between 30.5 and 34.4 million tonnes for 1985, and 34.1 and 40.1 million tonnes for 1990, using the two alternative world projections outlined previously. These figures are fairly consistent with the forecasts by the Canadian

Wheat Board and other agencies. These forecasts for 1985 only are outlined in Table 6. As reported in bushels, they show an almost equal split between domestic utilization and export. If we convert on the basis of wheat, the C.W.B. export forecast translates to 38.2 million tonnes, and the Sask Pool forecast translates to 30.3 million tonnes. As only a small porportion of domestic grain passes through port facilities, it is primarily the export marketings that must be handled and transported.

The implications for Western Canada are that given production (1) the marketing system won't be able to handle at least 50% more exports than at present, and (2) the direction if exports will shift toward the Pacific Rim, and thus through the West Coast.

Table 6

Forecasts of Total Production, Domestic and Export Use, of Principal Grains in 1985*

	Utilization		Production
	Domestic	Export	
	million of bushels		
Canadian Wheat Board	860	1,040	1,900
Canada Grains Council	925	870	1,795
Cargill Grain	905	850	1,800
Westburn Development Consultants	800	850	1,650
Sask. Wheat Pool	1,080	825	1,905

Source: Grain Transportation and Handling in Western Canada, Booz,Allen and Hamilton, July, 1979.

4. The Marketing System - Current and Future Capability

This past crop year, 1979/80, set records for both farm deliveries, 28,112 thousand tonnes, and for exports of 21,728 thousand tonnes surpassing the previous record of 20,498 thousand tonnes in 1972/73. Exports through Thunder Bay totalled 13,617 thousand tonnes and 9,156 thousand tonnes through the West Coast. (Canadian Grain Commission).

Although numerous changes have been made under the grain system this has not significantly increased its throughput capability from How to expand the capability of the grain handling and transportation system has been the subject of numerous studies, both private and government, in the 1970's. They are too numerous to mention; the most significant being the Hall and Snavely Commission Reports, and the

Booz-Allen and Hamilton report in 1978.

The Booz-Allen and Hamilton Report (to be referred to as the Booz-Allen report from here on) is the most relevant for our purposes because it was directed "...to develop recommendations to improve throughput of export grain so that potential for increased sales can be optimized". (Booz-Allen, p. 1.1).

The study took as its scope of analysis the requirement of the system to handle the 50% increase in anticipated exports by 1985. The study first made some assumptions about the level and direction of grain movements. Two levels of movement were forecast for 1985, a low forecast of 24,900 thousand tonnes (21,630 export and 3,270 domestic) and 29,720 thousand tonnes (26,450 export and 3,270 dometic). The high forecast estimated that exports of 13,250 thousand tonnes would be moved through the West Coast, and 13,200 thousand tonnes through Thunder Bay and Churchill.

The report undertook to study each component of the system separately in terms of capacity constraints but attempted to take account of interaction effects through a dynamic systems approach. For example a simulation model of the Vancouver grain system was used to test various proposed and expected changes.

Projections were made for the likely configuration and capacity of the primary elevator system for 1985. The number of licensed elevators was estimated to decline to 2,588 in 1985, down from 3,658 in 1978, and 4,999 in 1968. This would result in 1,725 operating units at 985 stations. On average, capacity is expected to increase to 2,700 tonnes in 1985, up from 2,500 tonnes in 1978. The study felt, however, "that with the exception of car spotting and lack of protein grading and identification system, the primary elevators should be able to handle the volume expected over the next few years" (Booz-Allen, p. VI-14.)

The study felt that the West Coast terminal and rail capacities would provide the greatest constraints. After conducting a simulation study of the Vancouver system, they concluded that existing terminals could deliver 10,800 thousand tonnes per year. To expand beyond this would require (1) that more grain be shipped to the West Coast as cleaned grain (2) smooth vessel flow to the ports, and (3) expand capacity at Prince Rupert. Booz-Allen suggested that 10 million bushels of new capacity at Rupert would add 2.75 million tonnes in annual throughput. This facility has now been agreed upon and will be built at an estimated cost of $100 million. The study foresaw no concern at Thunder Bay.

The cars, locomotives and main line capacity were seen as major future constraints. At the time the study was conducted in 1978, the car fleet consisted of 12,385 box cars, 7,760 federal government hopper cars and 970 C.W.B. hopper cars; a total of 20,145. This same fleet by 1985 would reduce to 14,682 with the box car fleet declining to 4,982 from 12,385 in 1978. A study of the system revealed potential areas for reducing the car turn around cycle. Depending upon forecast volumes and car cycle efficiency the study came up with

an estimate of new car requirements of between 6,000 and 13,300 for 1985/86. The top forecast volume of approximately 30 million tonnes, and the study's hoped for target car cycle resulted in the requirement for 9,300 new cars. This would cost an estimated 400 million at 1979 price of $43,000/car.

The study further estimated that CN and CP needs 400 locomotive units in 1979 and 504 units by 1985. At $850,000/unit, and with 20% replacement per year, the total cost for locomotives at 1979 dollars would be $171 million. In examining main line problems to the West Coast, the study based on CN and CP programs estimated that it would cost $260 million to upgrade the main line. Rehabilitation of branch lines were forecast to cost a further 700 million. In total the study foresaw needed investments of between $1.3 to $2.0 billion. The study, in quoting the C.W.B.'s estimate of lost sales of over one-half billion in 1977/78 due to the inability to deliver grain to the ports, suggests very strongly that these investments are economic.

What has happened since the study? The three prairie governments have promised to provide 2,400 new hopper cars, 25% of the projected car requirements. The Prince Rupert terminal will be built by a consortium of elevator companies with Alberta government support. P.M. Trudeau, in the last election promised in the area of $800 million for rail line improvement.

More recent than the Booz-Allen study is a report by the Canada Grains Council on the "Railway Capacity Requirements in the Eighties". The report forecasts a very large increase in railway bulk commodity movement in Western Canada. It points out that between 1965 and 1978 rail loading in Western Canada increased by 90 percent from 51.6 million tonnes to 98.4 million tonnes. The forecast till 1990 is outlined in Table 7.

Table 7

Commodity	1978	1990	Increase percent
	Millions of tonnes		
Grain	26.6	34.0	38
Fertilizer materials	15.7	28.0	78
Coal	15.5	35.0	125
Forest Products	17.6	29.0	65
Other Commodities	25.0	37.0	48
Total	98.4	163.0	66

Grain is projected to increase the least, 38% compared to coal at 125%.

This clearly raises the need for increased capacity, particularly main line. To meet this challenge the Canada Grains Council report

produces a projected capital expenditure requirement for Canadian Pacific of $5.43 billion and Canadian National of $8.53 billion, a total of $13.96 billion. Of this total, 9.33 is for road expenditures including double tracking, grade decisions, etc.

How will this expenditure program be financed? How will it affect grain and thus the Crow rate? These are still open questions. If I am allowed a political-economic comment, I feel that the Western Canadian agricultural community is slowly, but surely, moving towards a position of resolving the current impasse over Crow. Therefore, it is likely safe to suggest that finally and at long last there are healthy signs that the marketing systems problems are being overcome. Now it's time to ask the question, can the grain economy meet the production challenge?